

# Biodiversity and Representativeness of Research Natural Areas on National Wildlife Refuges in Montana

**Designated Areas Within Benton Lake, Charles M. Russell,  
Lake Mason, Medicine Lake, and Red Rock Lakes  
National Wildlife Refuges**

---

FINAL REPORT  
August, 1999

---

Submitted to the  
U. S. Fish and Wildlife Service

Prepared by:  
Stephen V. Cooper and Bonnie L. Heidel



MONTANA  
**Natural Heritage  
Program**

# Biodiversity and Representativeness of Research Natural Areas on National Wildlife Refuges in Montana

**Designated Areas Within Benton Lake, Charles M. Russell,  
Lake Mason, Medicine Lake, and Red Rock Lakes  
National Wildlife Refuges**

August, 1999

©1999 Montana Natural Heritage Program

---

State Library Building . P.O. Box 201800 . 1515 East Sixth Avenue . Helena, MT . 59620-1800 . 406-444-3009

## **This document should be cited as follows:**

Cooper, S. V. and B. L. Heidel. 1999. Biodiversity and representativeness of Research Natural Areas on National Wildlife Refuges in Montana: designated areas within Benton Lake, Lake Mason, Medicine Lake, Red Rock Lakes and C. M. Russell National Wildlife Refuges. Unpublished report to U.S. Fish and Wildlife Service. Montana Natural Heritage Program, Helena. 63 pp. plus appendices.

---

## **Abstract**

There are fifteen Research Natural Areas (RNAs) on National Wildlife Refuges administered by the U.S. Fish and Wildlife Service in Montana. Each was inventoried for significant ecological and botanical attributes: outstanding plant association examples, rare plant associations, and Montana plant species of special concern. Two more study sites with existing or prospective special management designation were also considered in the inventory work. Biodiversity and representativeness information was prepared for each study site, including a profile of all well-developed and uncommon native plant associations, description of any rare plant species populations, and a summary of biodiversity significance that incorporates this new data with original RNA designation records. Related information was compiled to help put results in context for each site, including description of environment, land use, management notes, and recognized non-biological values.

As a result, ten outstanding plant association examples, four rare plant associations, and four Montana plant species of special concern were documented within twelve of the study sites. Most of the study sites are located in the Great Plains, complementing one another and generally representing biodiversity features not otherwise under special management designation in Montana. These include riparian and dune systems, once-widespread grassland plant associations that have been drastically reduced elsewhere and rare grassland plant associations that have not been reported in Montana before, uncommon forest and woodland plant associations, and suites of successional habitats associated with black-tailed prairie dog colonies. Individually and collectively, these RNAs help anchor the conservation of Great Plains natural environments and their component plant associations and species.

We recommend additional surveys that extend beyond current RNA boundaries to identify areas that would fill gaps and achieve representation at scales more consistent with ecological processes and the historic nature of once-widespread vegetation types. The greatest potential for such areas is in the Charles M. Russell NWR and on surrounding public lands, which offer unique opportunities for identification and conservation of representative large-scale landscape systems.

---

## Acknowledgements

The expertise and interest of all USFWS personnel with whom we worked is gratefully acknowledged, along with the project support of the U.S. Fish and Wildlife Service (USFWS) – Upper Missouri/ Yellowstone River Ecosystem Team and the U.S. Fish and Wildlife Service – Ecological Services Office in Helena. We thank Steve Martin of Benton Lake National Wildlife Refuge whose interest and support catalyzed this project. Jim Stutzman - USFWS Montana Wildlife Habitat Office lent initial project support in an agreement between the Montana Partners for Wildlife Program and Montana Natural Heritage Program. Refuge coordination and access were graciously provided by Mike Rabenberg (Medicine Lake National Wildlife Refuge), Steve Martin (Benton Lake National Wildlife Refuge), Mike Hedrick, Bill Berg, Bill Haglan, Everett Russell, and Matt DeRosier (Charles M. Russell National Wildlife Refuge) and Daniel Gomez (Red Rock Lakes National Wildlife Refuge); with able navigation and assistance provided by skippers Glen Guenther and Jody Jones. The report was reviewed in draft form, and comments and corrections were provided by Steve Martin, Bill Haglan, Tedd Gutzke, Mike Rabenberg, and Jim McCollum.

This work also benefited from the time and skills of Montana Natural Heritage (MTNHP) staff. Jim Vanderhorst provided botanical expertise in field inventory at one site. Scott Lee-Chadde digitized sampling locations and contributed GIS map products. Steve Chadde and Cedron Jones conducted the original work in years prior to this project that set up the databases with RNA information, subsequently used to plan this inventory and provide a framework for compiling new information. The Biological Conservation Database and its linked series of datasets represent the contributions of many MTNHP staff, as well as the work of biologists statewide.

This project was funded under two, separate one-year work order and challenge cost-share agreements between the U. S. Fish and Wildlife Service Program, the U. S. Fish and Wildlife Service – Ecological Services Office in Helena, and the Montana Natural Heritage Program.

# TABLE OF CONTENTS

|  |    |
|--|----|
| INTRODUCTION.....  | 1  |
| STUDY AREAS.....   | 4  |
| METHODS.....   | 6  |
| RESULTS.....   | 10 |
| BENTON LAKE NATIONAL WILDLIFE REFUGE.....                  | 13 |
| Mullan Trail Research Natural Area.....                    | 13 |
| CHARLES M. RUSSELL NATIONAL WILDLIFE REFUGE.....           | 15 |
| Fourth Ridge Research Natural Area.....                    | 15 |
| Hell Creek Potential Research Natural Area.....            | 17 |
| Limber Pine Research Natural Area.....                     | 18 |
| Manning Corral Prairie Dog Town Research Natural Area..... | 22 |
| Missouri River Bottomlands Research Natural Area.....      | 24 |
| Prairie Dog Island Research Natural Area.....              | 28 |
| Spring Creek Research Natural Area.....                    | 30 |
| Two Calf-Douglas-fir Research Natural Area.....            | 33 |
| York Island Research Natural Area.....                     | 36 |
| LAKE MASON NATIONAL WILDLIFE REFUGE.....                   | 39 |
| Lake Mason Research Natural Area.....                      | 39 |
| MEDICINE LAKE NATIONAL WILDLIFE REFUGE.....                | 41 |
| Big Island Research Natural Area.....                      | 41 |
| Bruce's Island Research Natural Area.....                  | 45 |
| Homestead Research Natural Area.....                       | 46 |
| Medicine Lake Sandhills.....                               | 47 |
| Tepee Hills Research Natural Area.....                     | 49 |
| RED ROCK LAKES NATIONAL WILDLIFE REFUGE.....               | 53 |
| Sheep Mountain Research Natural Area.....                  | 53 |
| DISCUSSION.....  | 57 |
| CONCLUSIONS AND RECOMMENDATIONS.....                       | 59 |
| LITERATURE CITED.....                                      | 61 |

## FIGURES

|  |    |
|--|----|
| Figure 1. Location of U. S. Fish and Wildlife Service-administered Research Natural Areas in Montana. ....   | 4  |
| Figure 2. Big Island Research Natural Area: Map of plant communities and associations. ....                  | 43 |
| Figure 3. Tepee Hills Research Natural Area: Map of distribution of plant communities and associations. .... | 51 |

## TABLES

|  |    |
|--|----|
| Table 1. Target list of Montana plant species of special concern in the study area .....   | 8  |
| Table 2. Synonyms among scientific names for dominant graminoids .....   | 9  |
| Table 3. Matrix of plant communities / associations by Research Natural Area within Montana's National Wildlife<br>Refuges (arranged alphabetically within lifeform). .... | 11 |
| Table 4. Partial matrix of National Wildlife Refuge RNA criteria and sites in Montana .....  | 57 |

## APPENDICES

|  |  |
|--|--|
| Appendix A. Community survey form  |  |
| Appendix B. Plant species of special concern survey form   |  |
| Appendix C. Photographs of state-significant vegetation features   |  |
| Appendix D. Vegetation constancy-cover sampling data - Not Available Online. See MTNHP for Details.          |  |
| Appendix E. Element occurrence records for Montana plant species of special concern                          |  |
| Appendix F. Illustrations of Montana plant species of special concern  |  |
| Appendix G. Vascular plants cited in this report, by common names, scientific names, and six-letter acronyms |  |